ScienceDirect

Materials Today: Proceedings

Volume 69, Part 3, 2022, Pages 786-788

Behaviour of energetic materials using reverse locking differential mechanism with bus body analysis

L. Karikalan, S. Venugopal, T. Logeshvaran

Show more

https://doi.org/10.1016/j.matpr.2022.07.212

Get rights and content

Abstract

The most common means of road transportation is buses. Apart from road conditions, the design of the bus body is mostly based on the performance restriction under different kind of load and operation situations. On an articulated city bus body, the Finite element approach was utilized to perform analysis, linear static, and impact analysis. The goal of this project is to simulate and predict the structural response of a bus body in terms of stress, strain, and displacement under a variety of loading and constraining scenarios. To establish an adequate trade-off between computing time and accuracy findings, sensitivity evaluations of FEM parameters were performed.

Introduction

The body of the bus construction should be balanced in order to achieve safety while the bus is working. It should be sturdy enough to withstand normal loads as well as accident loads. The engine, chassis, structural body, interior and exterior sections make up the bus body [1], [2]. The chassis and engine play a significant role. They must pass a series of tests administered by both domestic and international organizations. The chassis is constructed up of a box-like frame that varies longitudinally based on the body's weight and strength requirements. A number of stiffeners are additionally installed in the place where the bending force is the greatest [3].

At the mounting points, unit weights such as the engine, gearbox, radiator, steering box, batteries, and fuel tank function as point loads. The weight of the understructure is regarded as a load that is equally distributed. The moment of vertical and lateral bending is computed, as well as the section required to transfer the weights, with a reserve factor based on road conditions [4]. Bodyweight is regarded as a load that is evenly distributed. The body construction is designed to allow for bending, torsion, and a combination of the two. Depending on the road conditions, there is a reserve component.

Section snippets

Analysis of bus body structure

Ansys mechanical is a finite element analysis tool for linear, nonlinear, and dynamic structural analysis. For a wide range of mechanical design issues, this computer simulation application integrates finite elements to simulate behavior and supports material models and equation solvers [5], [6], [7]. Thermal analysis and coupled-physics capabilities, such as acoustics, piezoelectric, thermal–structural, and thermal–electric analysis, are also included. Ansys provides a comprehensive software…

FEM

The FEM is a numerical solution approach to the equations that govern natural problems. Normally, the behavior of nature may be explained using differential or integral equations. Calculations, models, and simulations are used in finite element analysis (FEA) to forecast and understand how an object will respond under various physical conditions [11]. To detect flaws in prototype designs, engineers employ finite element analysis (FEA). Using finite element analysis throughout the design phase…

Result and discussion

The results are shown in following Fig. 4.1, Fig. 4.2, Fig. 4.3 respectively. It shows the clear cut idea of model, total Deformation for set 1 and Total Deformation for set 2 with respect to all boundary conditions.…

Conclusion

Ansys software is used to assess the body structure of a bus in this study. The bodily structure proportions were collected from the publication referenced in the literature review. By lowering the number of parts and changing the thickness, the original body is remodeled. Such that the overall weight of the vehicle is lowered Steel is the most often used structural material nowadays. As a result of the substitution of composite materials, the structure's weight is reduced. Both structures are…

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.…

Special issue articles Recommended articles

References (15)

S. Khelge *et al.*
Optimization of wear properties on aluminum alloy (LM22) hybrid composite
Mater. Today: Proc. (2022)

J. Kumaraswamy *et al.*
A review on mechanical and wear properties of ASTM a 494 M grade nickel-based alloy metal matrix composites
Mater. Today: Proc. (2021)

S. Ramasubramanian *et al.*
Performances emissions behaviors of Compression ignition engine by mahua oil
Mater. Today: Proc. (2021)

N.K. Chandramohan *et al.*

Comparison of chassis frame design of Go-Kart vehicle powered by internal combustion engine and electric motor
Mater. Today: Proc. (2021)

S. Khelge *et al.*
Effect of reinforcement particles on the mechanical and wear properties of aluminium alloy composites: Review
Mater. Today: Proc. (2022)

Madhuvanesan *et al.*
Design and Analysis of Bus Body Structure
Int. J. Res. Eng. Sci. (IJRES) (2021)

P. Chinta *et al.*
A New Design and Analysis of BUS Body Structure
IOSR J. Mech. Civ. Eng (2014)

There are more references available in the full text version of this article.

Cited by (0)

View full text